HI Beacon data – a rather preliminary look

Sarah Matthews

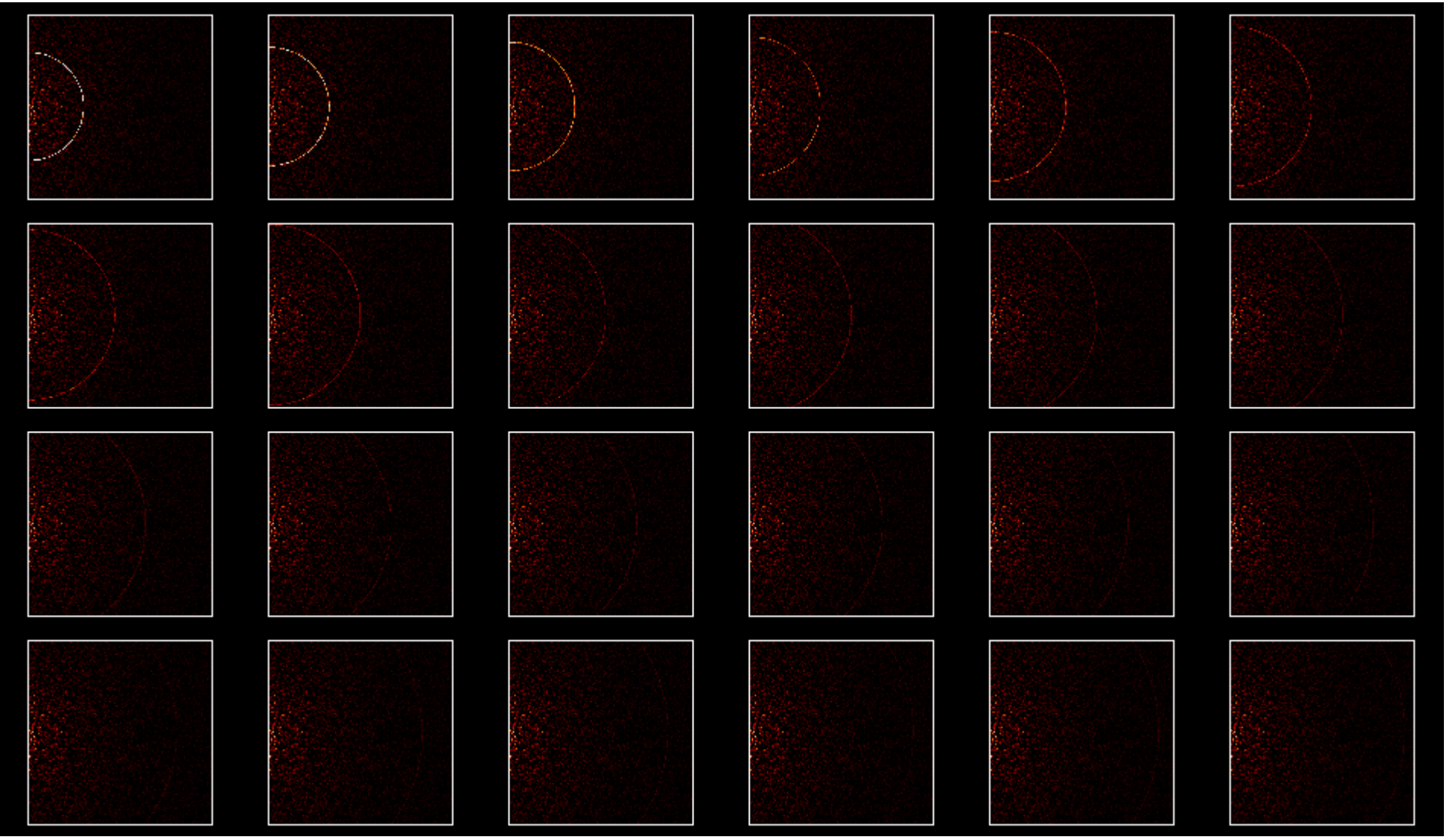
Mullard Space Science Lab., University College London

Possibilities

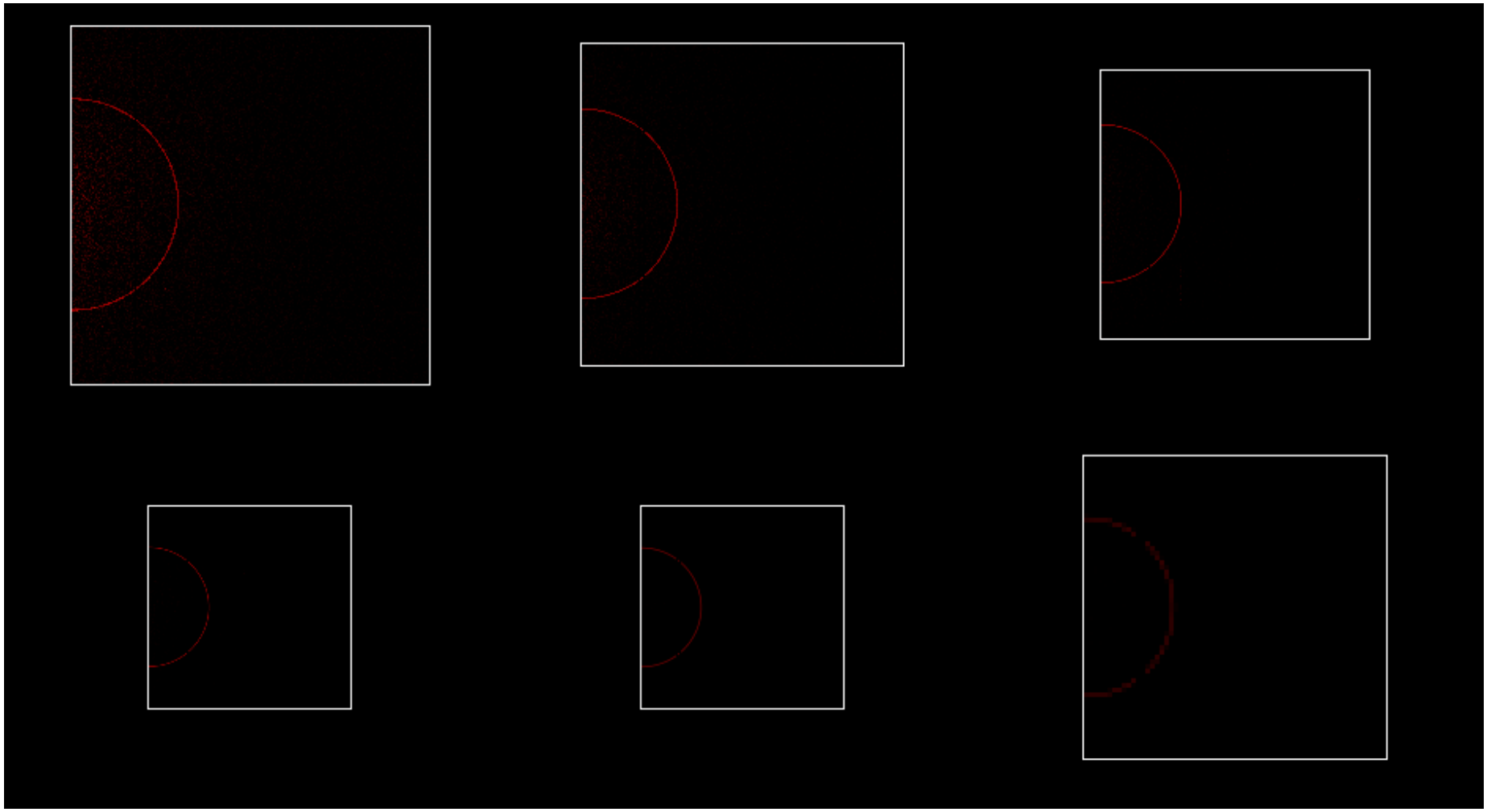
- Thumbnail images
- N-S index strips – at one or more positions to provide velocity information
- E-W strips would give better indication of speed
- Radial stack-plots – better indication of speed and direction of propagation?

Thumbnail images

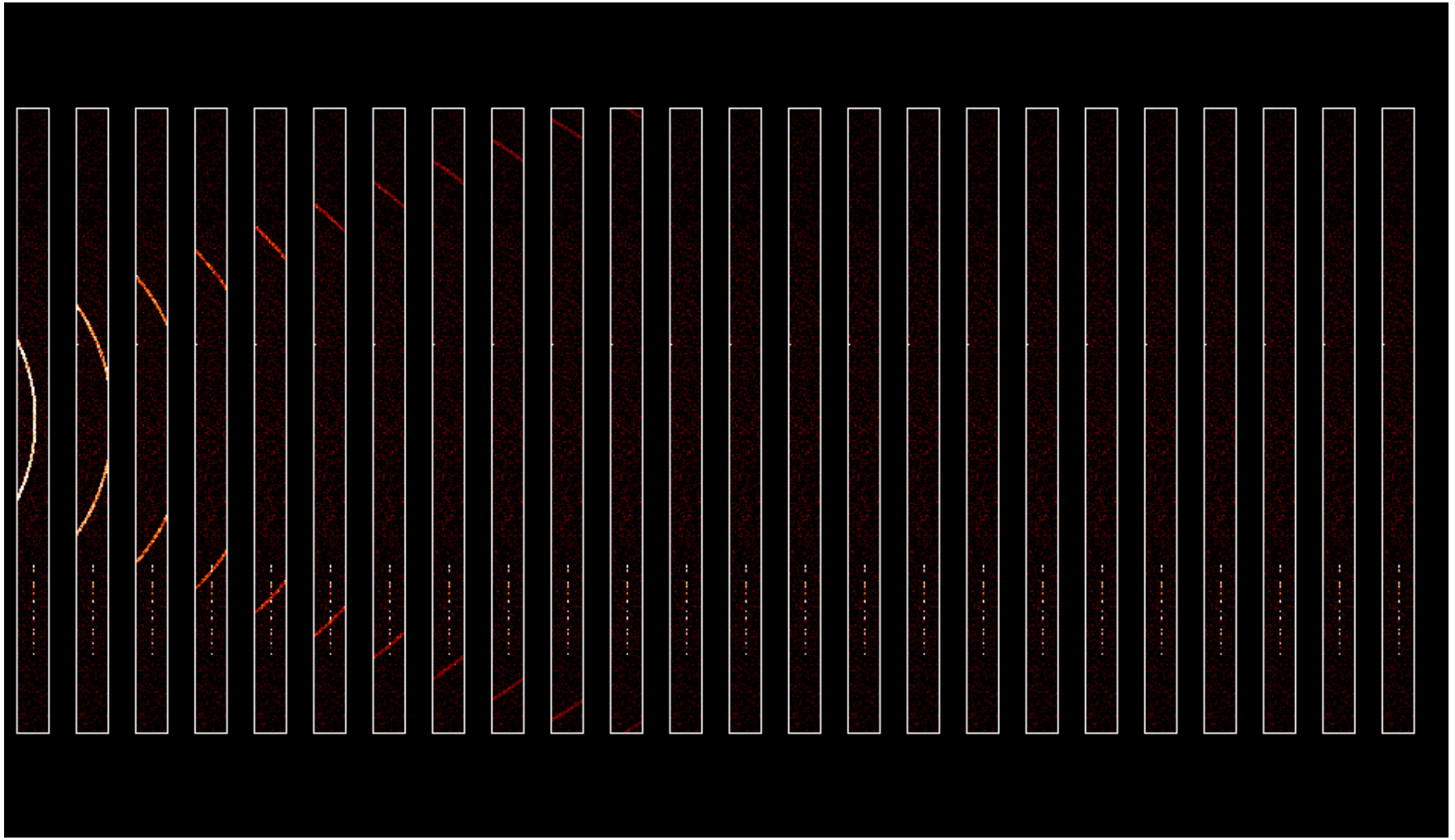
- Simulated HI-1 and HI-2 images for a CME propagating at 400 km/s – but only through the summed exposures…
- $1/R^2$ fall off in intensity
- Base frame subtracted
- 2 cases:
  - Nominal exposures: 70 for HI-1 and 60 for HI-2
  - Half the nominal exposures



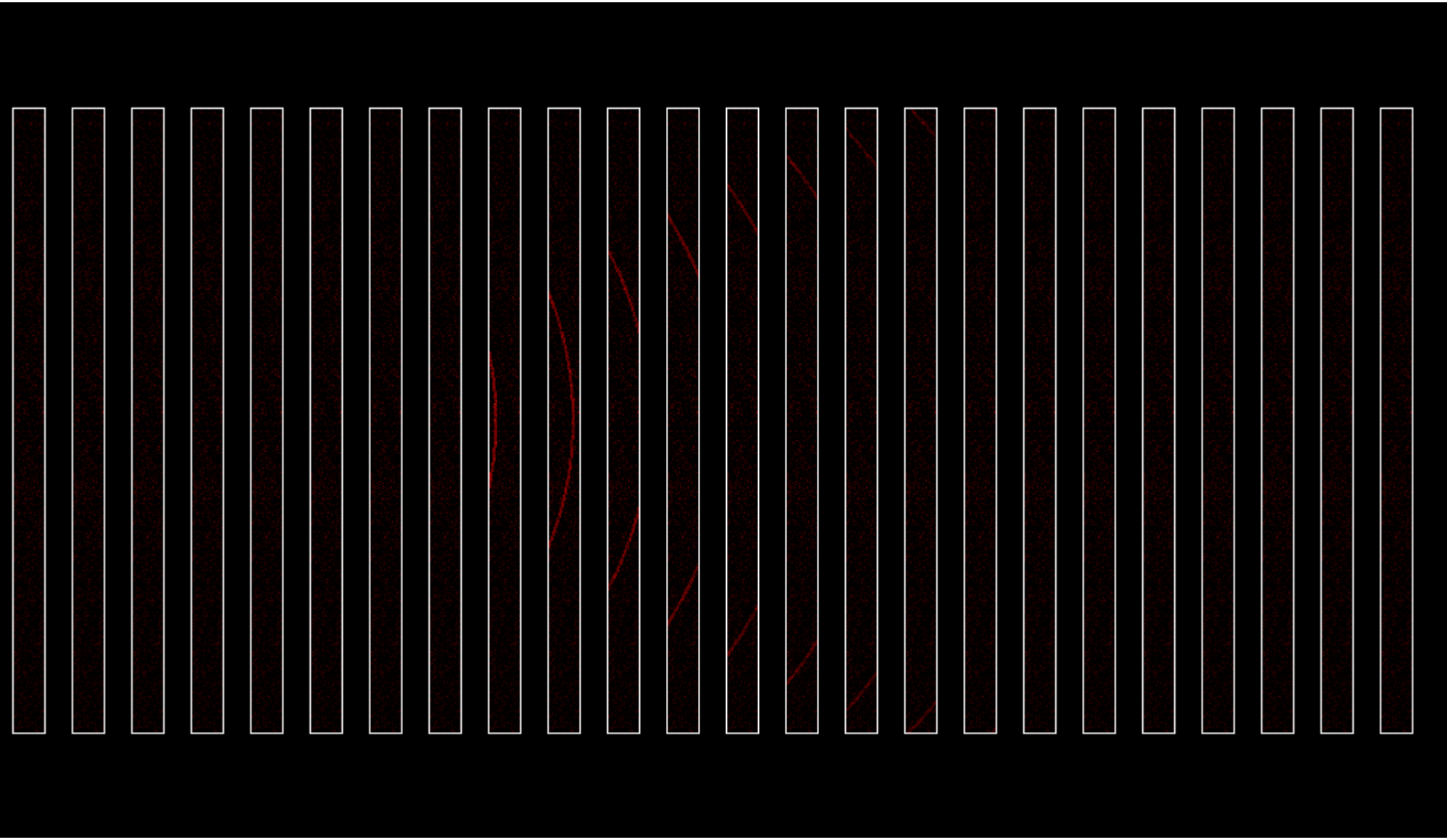
HI -1 CME propagating radially out at 400 km/s



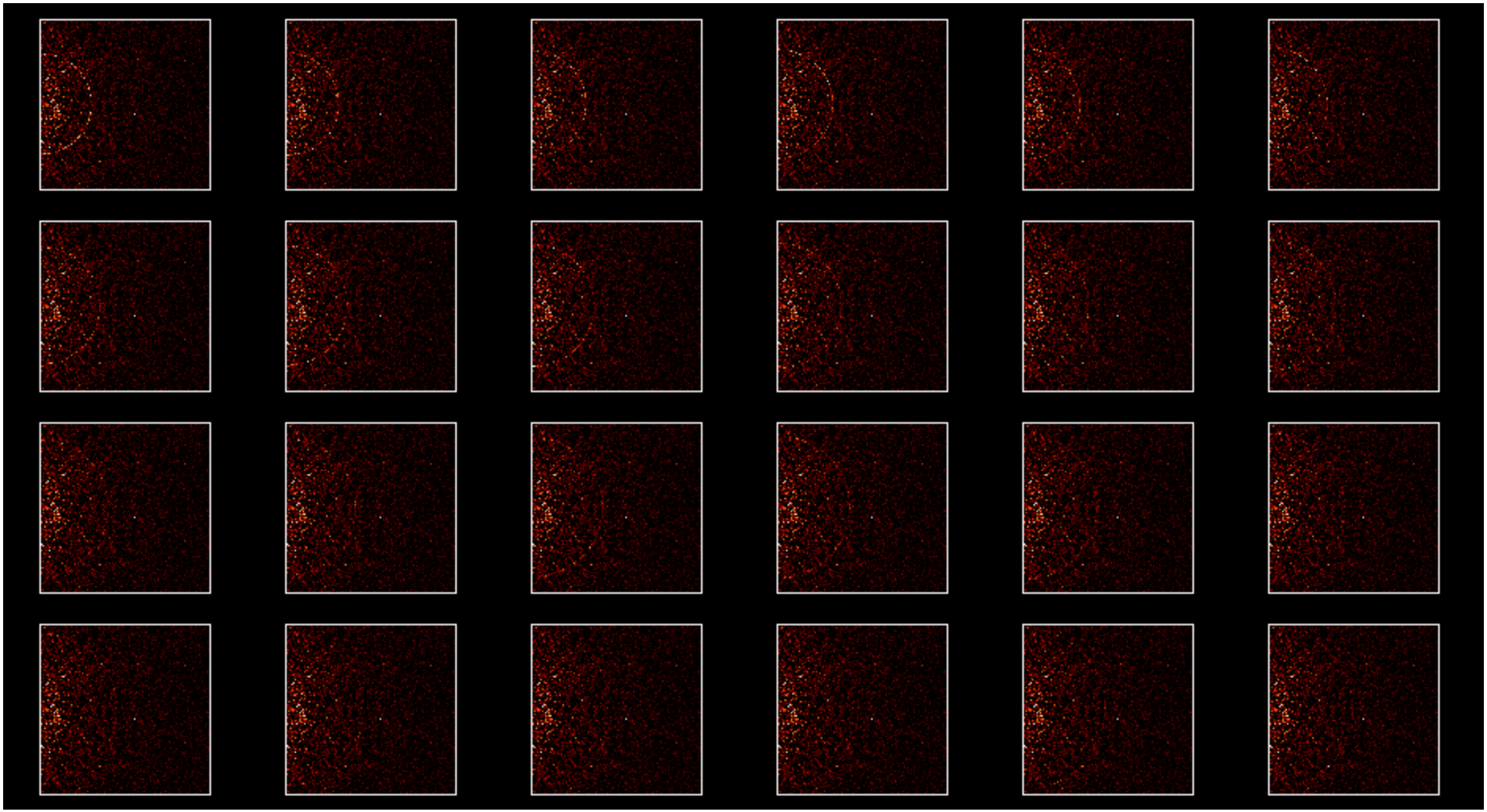
-1 thumbnails – 400 km/s CME, 1/R² intensity fall-



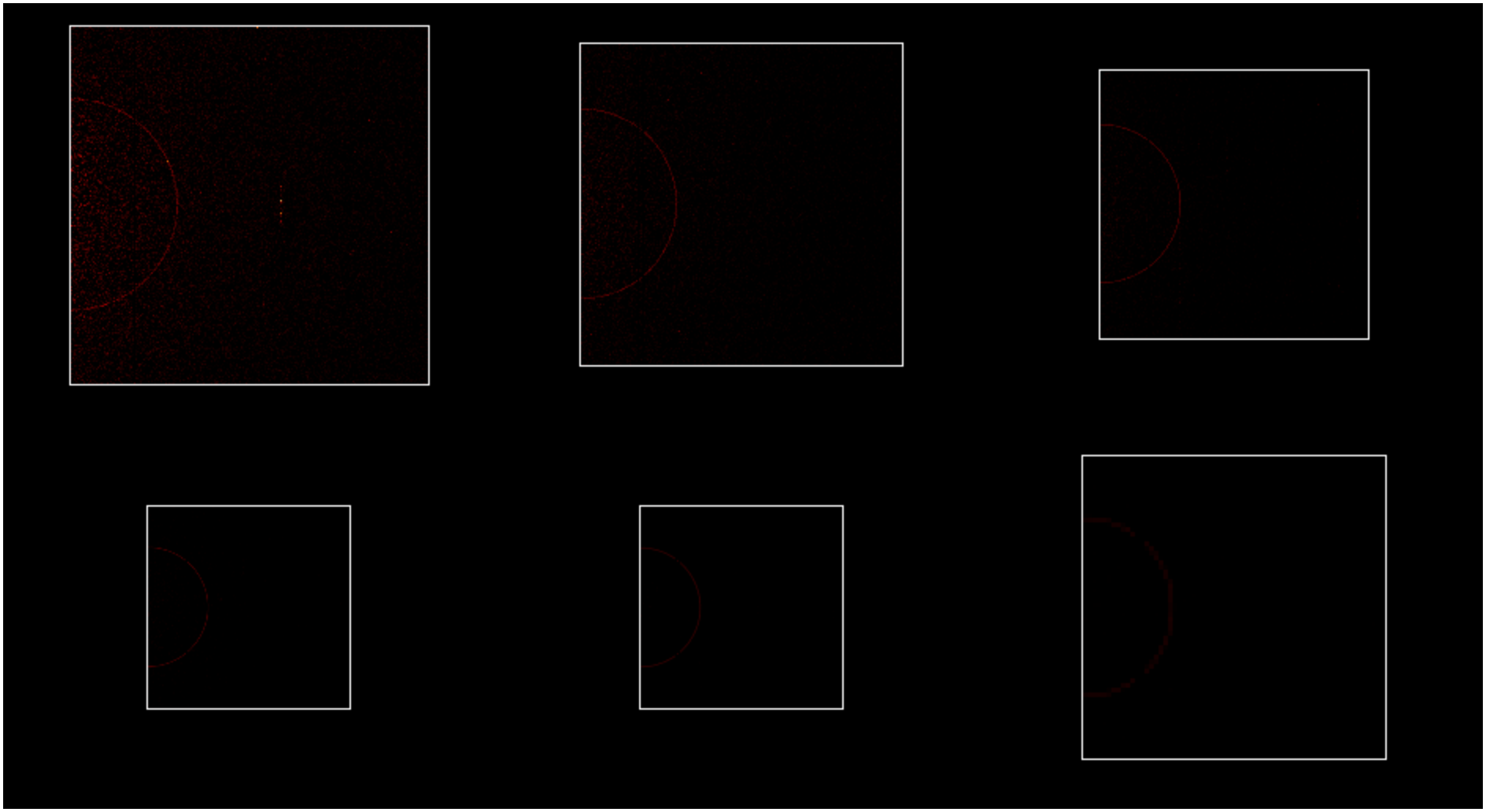
N-S strip of pixels between 550-650



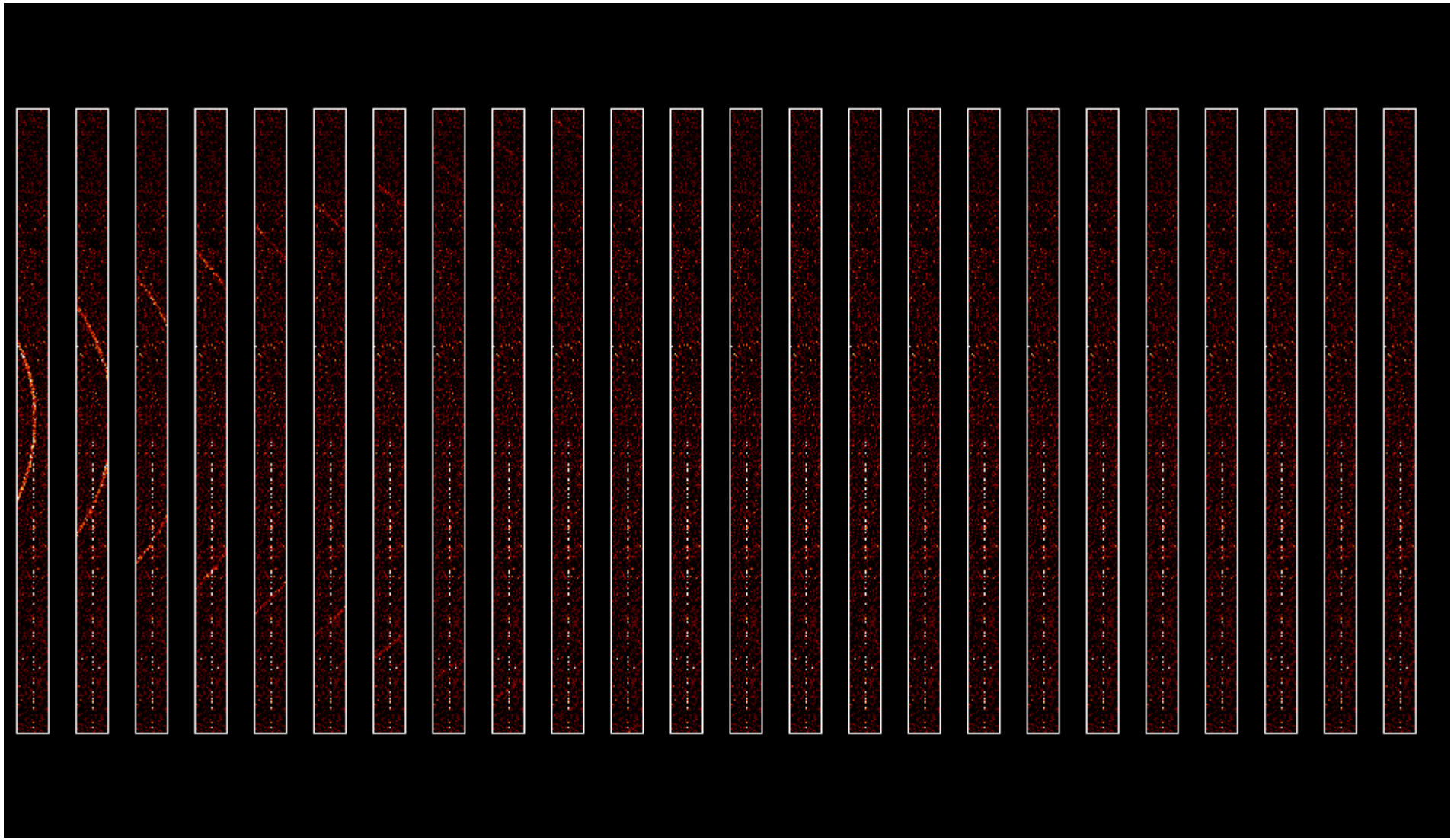
N-S strip including pixels from 1050-1150



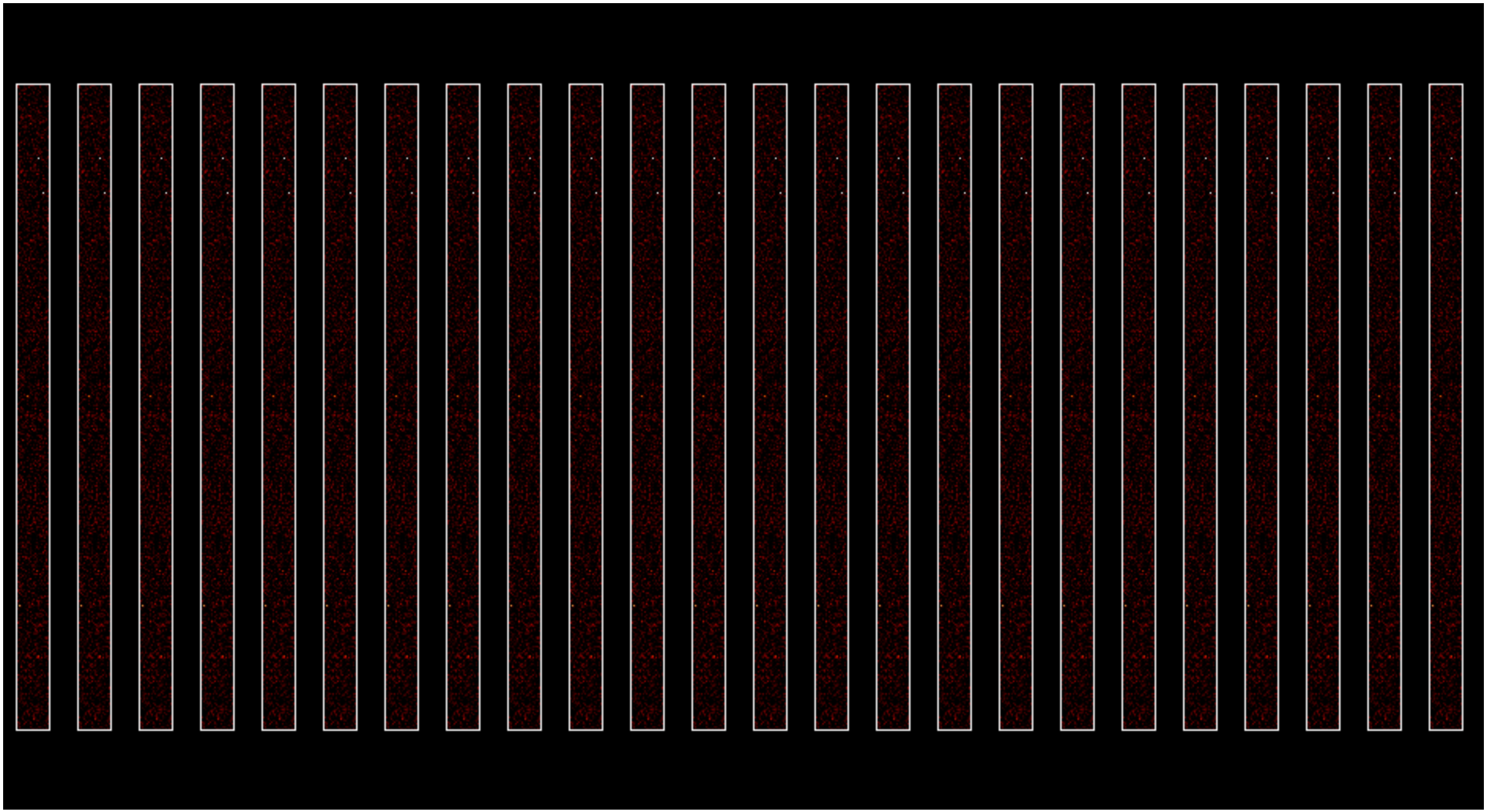
HI-2 CME 400 km/s



HI-2 thumbnails



HI-2 strips, pixels 550-650



HI-1 strips, pixels 1050-1150

- The CME seems to be surprisingly visible in the thumbnail images, at least in the first summed frame – this is probably not the case if real propagation during the exposures that are summed is considered.
- N-S strips also work reasonably well for this very simple case. For velocity determination an E-W strip might work better - though if the CME isn’t symmetric in nature it might be difficult to interpret.
- A combination of E-W strip and intermittent thumbnails might work well, but are probably too resource intensive.

What next

- Include propagation effects in the exposures prior to summing.
- A range of more realistic CMEs with different shapes and speeds.
- E-W strips and maybe radial stackplots
- All these images have a base image subtracted, which may not be feasible – need to see whether something like an E-W strip would show the CME intensity without this.
- Telemetry and processing implications; compression effects.